CHAPTER 4

PROCEDURE FOR DETERMINING POL, VEHICLE PARKING,
AND YARD STORAGE FACILITY FIRE FLOW DEMAND

4-1. General. The required fire flow demand for POL, vehicle parking, and yard storage facilities is determined using the following steps. Deviation from these steps may be required depending upon the particular circumstances at each facility.

4-2. Above-ground atmospheric POL tanks. The fire protection water supply necessary to protect this type of facility includes the water necessary to cool a burning tank, to cool exposed tanks, and to supply special fire suppression systems.

   a. Step one. Determine the fire flow rate needed to cool the largest tank in a tank farm facility, from table 4-1.

Table 4-1. Atmospheric POL Tank Cooling Water

Tank Diameter (feet)	Fire Flow Rate (gpm)
0 – 65	500
65 – 120	750
120 – 155	1,000
155 – 200	1,250
200 or greater	1,500

   b. Step two. Determine the fire flow rate necessary to cool exposed tanks, pressure vessels, or handling facilities that are within 50 feet or one tank diameter of the largest tank under consideration, whichever is greater. Allow 500 gpm for each such exposed tank, pressure vessel, or handling facility.

   c. Step three. Determine the water flow requirements for special fire suppression systems from paragraph 1-2.k.

   d. Step four. Determine the required fire flow rate by adding the fire flow rate requirements determined in step one through three, rounded to the nearest 250 gpm.

   e. Step five. The required fire flow rate is to be available for a minimum duration of 4 hours.

   f. Step six. Determine the required residual pressure. When the special fire suppression system pressure requirements are greater than that of the required fire flow demand, increase the pressure of that portion of the fire flow demand needed to operate the special systems.

The remainder of the fire flow demand may be supplied at the established residual pressure or at a higher pressure.

4-3. Above-ground pressurized POL tanks. The fire protection water supply needed to protect this type of facility is similar to that needed for atmospheric tanks. It includes water for cooling the subject tank, for cooling exposed tanks, and for special fire suppression systems.

a. Step one. Determine the fire flow rate needed to cool the subject tank or group of tanks from table 4-2.

Table 4-2. Pressurized POL Tank Cooling Water

Tank Group Size	Fire Flow Rate (gpm)
Single tank (less than 30,000 gallon capacity)	250
Single tank (more than 30,000 gallon capacity)	500
2 to 6 tanks (each tank less than 30,000 gallon capacity)	500
2 to 6 tanks (one or more tank greater than 30,000 gallon capacity)	1,000
7 or more tanks (each tank less than 30,000 gallon capacity)	1,000
7 or more tanks (one or more tanks greater than 30,000 gallon capacity)	1,500

b. Step two. Determine the fire flow rate necessary for protection of exposed facilities. Provide 500 gpm for each atmospheric tank within 50 feet of a pressurized tank grouping and 250 gpm for each handling facility within 50 feet of a pressurized tank grouping.

c. Step three. Determine the water requirements for special fire suppression systems from paragraph 1-2.k.

d. Step four. Determine the required fire flow rate by adding the fire flow rate requirements determined in steps one through three, rounding to the nearest 250 gpm.

e. Step five. The required fire flow rate should be available for a minimum duration of 4 hours.

f. Step six. Determine the minimum required residual pressure. If the special fire suppression pressure requirements are greater than that of the required fire flow demand, increase the pressure of that portion of the fire flow demand needed to operate the special systems. The remainder of the fire flow demand may be supplied at the established residual pressure or at a higher pressure.

4-4. POL handling facilities. The required fire flow demand for POL handling facilities is to be determined according to the procedures presented in chapter 3, for determining building fire flow requirements (excluding step five). The flow duration should be available for a minimum of 4 hours. Each exposed tank is to be treated as an exposed facility for use in determining increases to the basic fire flow rate.

4-5. Aircraft parking and refueling facilities. A minimum fire flow rate of 1,000 gpm for a 2-hour duration is to be provided for all such facilities.

4-6. Vehicle parking. A minimum fire flow rate of 500 gpm for a 2-hour duration is to be provided for all such facilities.

4-7. General yard storage.

a. Step one. Determine yard storage parameters.

(1) Item one. Storage pile height. This manual considers two classifications of storage pile height: low piled storage which does not exceed 15 feet, and high piled storage which exceeds 15 feet.
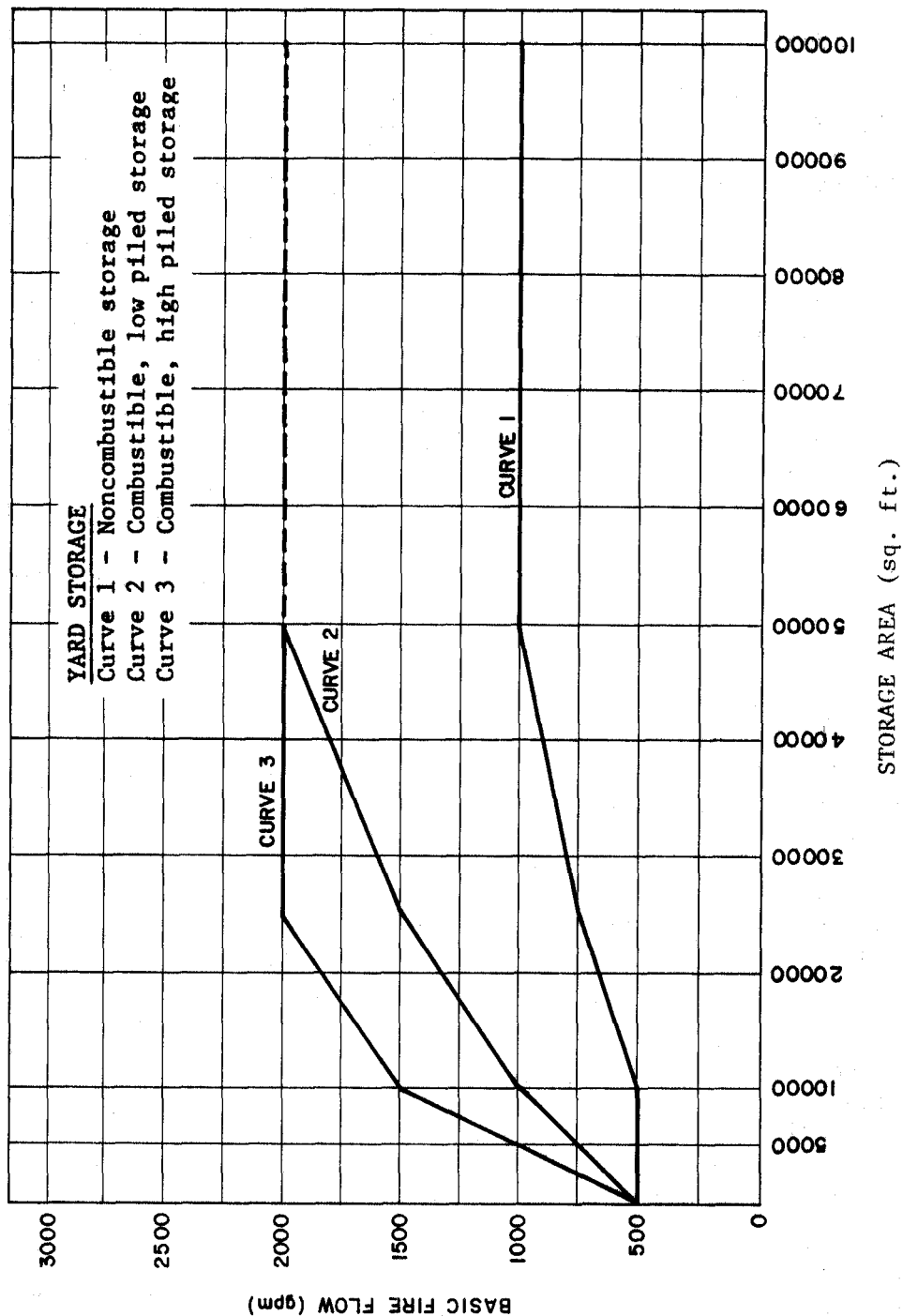
(2) Item two. Stored material class. This manual considers two classes of yard storage, "noncombustible" storage as defined in NFPA 231 and "combustible" storage which constitutes all other storage.

(3) Item three. Storage area. The area available for storage.

(4) Item four. Exposed facilities. Determine the distance from the storage area to each exposed facility. This distance is the shortest distance from the storage area perimeter to the exposed facility and rounded to the nearest whole foot. This distance is to be measured for each exposed facility.

b. Step two. Using the parameters obtained in step one, choose the appropriate curve on figure 4-1 or 4-2 to be used in developing the basic fire flow rate. The curves on figure 4-1 or 4-2 consider the storage height and class of the stored materials.

c. Step three. Determine the basic fire flow rate from the appropriate curve on figure 4-1 or 4-2 using the storage pile area determined in step one, item three.

YARD STORAGE
Curve 1 – Noncombustible storage
Curve 2 – Combustible, low piled storage
Curve 3 – Combustible, high piled storage

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FIGURE 4-1.   YARD STORAGE CURVES (0 TO 100,000 SQUARE FEET)
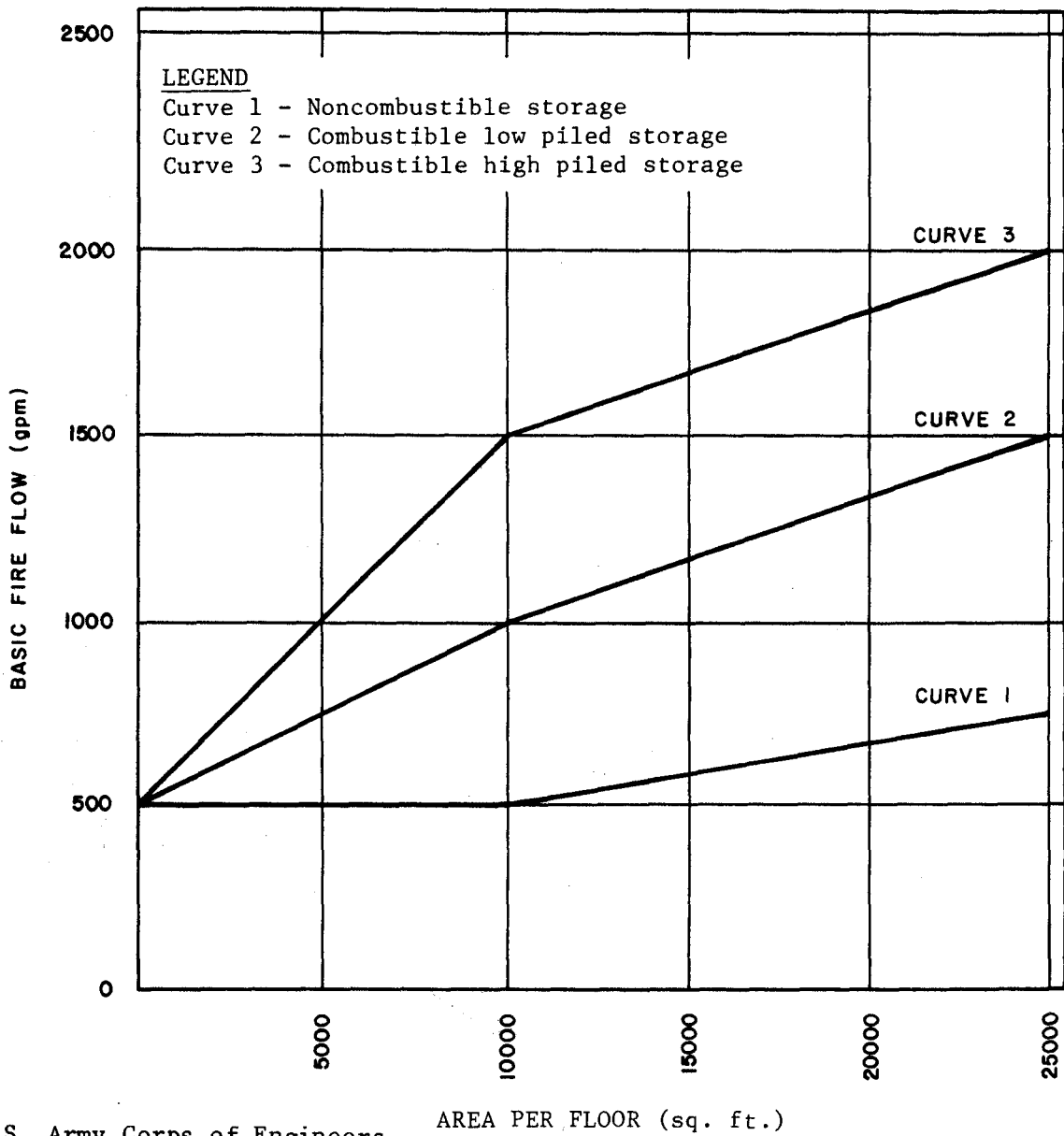
FIGURE 4-2. YARD STORAGE CURVES (0 TO 25,000 SQUARE FEET)

d.. Step four. Determine the increase needed for exposure protection.

(1) Item one. Determine the separation factor from table 3-1 for each exposed facility using the distances developed in step one, item four.

(2) Item two. Add the separation factors for all exposed facilities.

(3) Item three. Determine the exposure factor from figure 3-3 using the sum of the separation factors calculated in item two above. The maximum value of the exposure factor is 1.75, even though the separation factor total may be greater than 15.

(4) Item four. Determine the required fire flow rate by multiplying the basic fire flow rate by the exposure factor, rounding to the nearest 250 gpm.

e. Step five. Determine the required fire flow duration from table 3-2 using the required fire flow rate calculated in step four, item four.

f. Step six. Determine the minimum required residual pressure.

4-8. Sample calculations. Appendix A, sample 2 provides an example of establishing the fire flow demands for a POL facility containing four tanks and a pumping station using the procedures outlined in paragraphs 4-2, 4-3, and 4-4.